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Energy Procedia 5 (2011) 1584–1588

Energy
Procedia

IACEED2010

A Method to Establish and Run Management System for Energy

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Abstract

Management system for energy (EMS) to be built as a rounded and effective management system of the document in the organization can be improved continuously through the energy saving monitoring, internal audit, management review etc. Currently that system still hasn't been widely established. The problem is that the energy service organization doesn't know how to help the enterprise to establish and run EMS. Through the concept and frame analysis of EMS, we propose a method how to establish and run EMS. The method is to identify all energy factors firstly, analysis the energy factor to be controlled prioritily, then draw up to set up the management project and make the system document. All the energy factors in the system's document are required to be able measurable. EMS is run by means of recording and investigating each energy factor in the energy using process, and carry out the purpose of the energy target.

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Selection and peer-review under responsibility of RIUDS

Key words: Energy, Management System, Establish and Run

1. The analysis of the concept and the frame of EMS

Currently, China is try to draw lessons from the ISO9000 and ISO14000 in the principle and thoughts for EMS, emphasize the norm in various energy management systems and measures, and pay attention to identify and make use of the feat economy energy technique and methods, to attain the purpose for saving energy and reducing the discharge[1, 2]. There are no actual EMS that had been built for the enterprise in

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china, although government just encourage to do the matter, because being in need of the related knowledge and experience[3].

Combining the core request for establishment and control of EMS, it is the analysis of the basic principle of system and frame for it as follows (see the Table 1):

Table 1. The basic principle and frames of EMS

Project	The demand for EMS
Core concept	The "energy" is taken as the core to be carried on the control and managements in EMS, the organization make sure of the concrete energy target and index sign, and build up the EMS for lower the energy depletion and raise energy efficiency by means of identifying the energy factor.
The scope of control	The control scope of the energy management will involve the whole process of the product realization, because the consuming of energy in the organization relate to the whole process of the product manufacture.
The object of control	The object of the energy manages try to control is mainly "the factor that can influence the consuming and using efficiency of energy", and then pass the management, consuming energy being controlled in the specified target scope.
The degree of control	The energy management even emphasize "opposite" of the control at the time of satisfying the energy target and index sign, and even paying attention to scoop out the potential for economizing on energy and raising the energy using efficiency continuously.
The method of control	In addition to control the key links and key points of importantly influence to energy using efficiency, the energy management still needs to pay attention to the rationality of equipments and systems to be matched.

2. The establishment method for EMS

According to the energy policy, the course of building up EMS is to find out influence factors of energy firstly, and take it into the control, then make sure the target of energy and establish energy management project, which includes related control procedures and investigates and records, by means of the thorough investigation to the enterprise. The step to establish EMS can do as follows:

- (1) Leadership decision and preparation: ① the commitment of leader ② appoints the representative ③ provides the resources;
- (2) Scope define: ① the scope of the organization activity ② the scope of the organization management power ③ the spot district and the geography boundary of the organization ④ the require of the laws and regulations ⑤ the service scope of the organization's product ⑥ the finance boundaries and the movement boundaries;
- (3) The beginning of the energy judgement;
- (4) The plan of the system;
- (5) The establishment of the energy management system document.

The management commitment is for EMS to be established, carried out, be kept and kept on improving by the highest leader. It ensures the fit resources that provide for EMS's needs, appoint the leader's representative etc. According to management commitment to establish and implement the energy policy and target, it is the organization's constitution of the development direction and strategic targets.

The beginning of the energy judgement is understanding the circumstance of the enterprise's property, scale and management circumstance etc, and assurance of the category, level and condition for using

energy in the enterprise, then carry on the analysis and evaluate for it, make sure the way to build up the energy management system.

In addition to draw up the energy target and index signs, the key things for the plan of the system to do are to identify the energy factors. Such as the Fig 1 show, to a enterprise, from the raw material enter to the product output, each production links contain several factors to influence energy depletion, some of the factors are the craft parameters of the control circumstance, some are the usages of the equipments maintenance circumstance, some are the level of operators etc. The energy consumption also is affected by the market factor, the environment factor and the laws factor at the same time for product. After identified all energy factors, it is want to carry on the evaluation to them, to assurance the energy factor for priority control, then draw up the energy management project to realize the energy target.

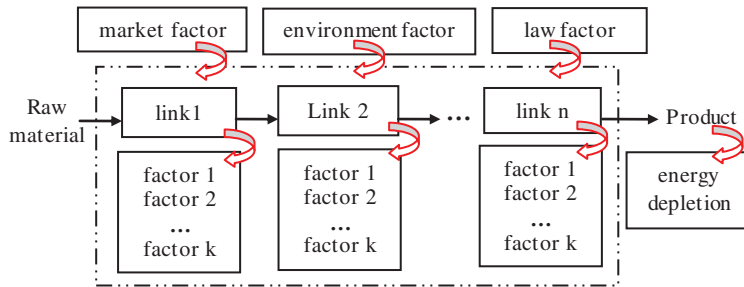


Fig 1. The energy factor and depletion

The establishment of EMS's document include: As for the decision to carry on the energy conservation management in my factory; My factory's energy policy; The decision about my factory's energy management basis and the mark pole; The decision about carries on the energy consciousness training for my company employee; The circular concerning with outside information exchanges; The laws and regulation's evaluation control procedure; The information exchanges control procedure; The energy factor control procedure; The energy usage management procedure; The economy energy reformation item management procedure; The rationalization suggestion collections procedure; The energy purchase management procedure; The document control procedure; The record control procedure; The energy monitoring and measure control procedure; The rectifying and preventing control procedure; The inner examination control procedure; The management judgment procedure, etc.

The document should include the contents as follows: the purpose and scope, the referenced documents, the duty of the stuff, work procedures, the records, etc. Of which, the work procedures are the core, which include how to control the energy factors. All the energy factors in the system's document is required to be able measurable. In the establishment and implementation of EMS, it should be paid attention to combine with other management systems and constantly improved and perfected.

3. The operation and improvement of EMS

It is adopted the idea of full process control and uses the mode of PDCA (Plan-Do-Check-Act) in EMS, such as shown in Fig 2. Integrating the existing quality management system and environmental management system, it is fully shown the features of energy management.

In order to achieve the smooth operation and improvement of EMS, organizations should provide appropriate resources such as personnels, facilities, monitoring measurers and funds, etc. And it also should provide training on workers who engage in energy management. In the running of EMS, the information communications should be carried out among the relevant departments and personnel. But it should be paid attention to that organizations should make full use of existing resources and reduce the

additional resources to facilitate for the rapid and economic start of management system in the provision of resources.

The operation of EMS is carried out in various departments. Each department runs according to their related control program, as shown in Fig3. Energy management agency is supreme representative of energy management organization, who is responsible for making energy policy, energy management baseline and standard, checking and correcting actions and internal audits, hosting the management

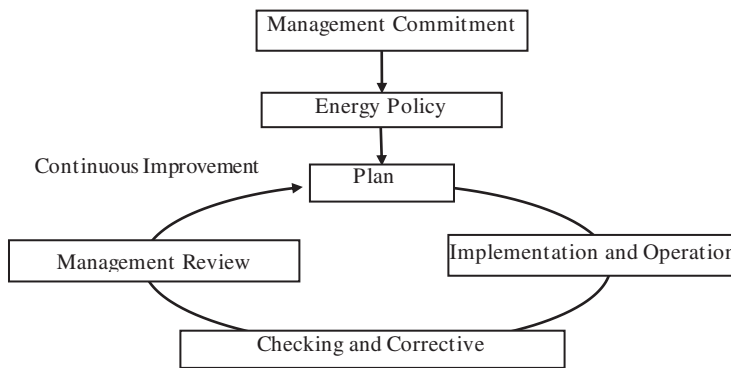


Fig 2. The operation mode of EMS standard

review. Functional departments include the company office, the knowledge division, the supply department, the design department, the technology department and information department, etc. The company office is responsible for legal regulations and standards, the knowledge division is responsible for the training of ability and consciousness, the supply department is responsible for energy procurement control, the design department is responsible for product and process design control, the technology department is responsible for energy-saving reform project management, and the information department is responsible for information exchange. The production department includes each production workshop, which are responsible for respective emergency preparedness and response, energy management solutions, energy factors control, corrective actions, preventive measures and rationalization proposal collection.

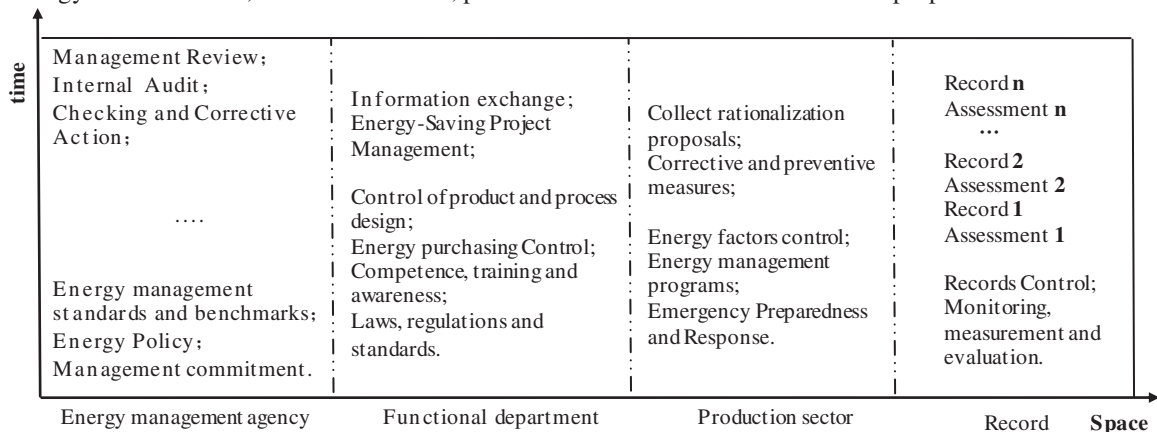


Fig 3. The space-time running of energy management system

The inspection and correction of EMS is carried out through the assessment. Each of the management procedures should be monitored, measured and evaluated by various departments. Each of the management procedures should be regularly assessed and recorded by the internal staff of departments,

and assessment is carried out according to records compared with the standard conditions. Energy management agencies regularly check the sampling of the department assessment situation, and the reward and punishment are based on assessment. The incentives should be proportional to the benefits of energy conservation to mobilize the enthusiasm of the staffs.

Internal audit should be done after a certain period of the operation of EMS by each department. Internal audit is to determine whether the energy management system meets the needs of organizational energy goals, the degree of achieving target, key energy equipments, and the efficiency of the system, comprehensive energy consumption and energy savings by the internal assessments of all departments and the external assessment of energy management agencies.

Management review is the assessment summary of the organization's EMS by the top manager to ensure its continuing suitability, adequacy and effectiveness. Results of internal audits are as one important basis of management assessment. The continuous improvement measures of EMS and energy conservation are proposed through management review, and the major decision will be made to revising energy management standards, principles, objectives, targets, etc.

4. Conclusion

The establishment and running of EMS can be carried out by the following method: firstly, identify the energy factor, after the identification of all the energy factors, evaluating them is to determine the energy factors of the priority control, and then develop energy management programs to achieve energy goals. The operation of EMS is carried out in various institutions, each department works according to the relevant control procedures. The inspection and correction for energy management system is carried out by the assessment. Each of the management procedures should be monitored, measured and evaluated by various departments. Each of the management procedures should be regularly assessed and recorded by the internal staff of departments, and assessment is carried out according to records compared with the standard conditions. Energy management agencies regularly check the sampling of the department assessment situation, and the reward and punishment are based on assessment. Internal audit should be done after a certain period of the operation of energy management system by departments. Results of internal audits are as one important basis of management assessment, the continuous improvement measures of energy management system and energy conservation are proposed through management review; It is to run EMS and achieve energy goals by revising energy management standards and the major decision-making about the change of benchmarks, principles, objectives, targets.

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